

## CLAIMS

What is claimed is:

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1. A method for making active nickel material for a positive electrode of a hydrogen storage battery comprising the steps of: forming active nickel material particles in the presence of an oxidizing agent.

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2. The method of claim 1 wherein the active nickel particles are successively grown in the presence of an oxidizing agent to partially oxidize some particles.

15 3. The method of claim 1 wherein forming further includes: providing an active nickel material seed with a first degree of oxidation and growing a second active nickel material about the seed, the second active material about the seed having a second degree of oxidation.

20 4. The method of claim 3 wherein the second degree of oxidation is 0% or about 0%.

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5. The method of claim 1 wherein the particles are grown in an oxidizing solution to provide oxidized and non-oxidized active material throughout each particle.

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6. The method of claim 1 wherein the particles are grown by the formation and breakdown of a metal complex to form a precipitate.

7. The method of claim 1 wherein forming active nickel material particles includes:

30 combining a metal ion solution, ammonium solution, a metal hydroxide and an oxidant in a reactor to precipitate the active nickel material particles.

8. The method of claim 7 wherein the metal ion solution is a metal sulfate solution.

9. The method of claim 8 wherein the ammonium solution is ammonium hydroxide  
5 and the metal hydroxide is sodium hydroxide.

10. The method of claim 8 wherein the metal ion solution includes one or more  
feed streams formulated to produce active nickel material with a base metal composition  
consisting essentially of Ni-Co, Ni-Co-Zn, Ni-Co-Zn-Mg, Ni-Co-Zn-Mg-Ca, and Ni-Co-  
10 Zn-Mg-Ca-Cu.

11. The method of claim 1 wherein the active nickel material has a base metal  
composition consisting essentially of Ni-Co, Ni-Co-Zn, Ni-Co-Zn-Mg, Ni-Co-Zn-Mg-Ca,  
15 or Ni-Co-Zn-Mg-Ca-Cu.

12. The method of claim 1 wherein the active nickel material particles comprise  
nickel hydroxide material and nickel oxyhydroxide material.

13. The method of claim 1 wherein the active nickel material particles include  
20 particles that are substantially spherical.

14. The method of claim 1 wherein forming further includes adjusting process  
conditions to make the active nickel material with an apparent density of 1.4 – 1.7 g/cm<sup>3</sup>, a  
25 tap density of about 1.8 – 2.3 g/cm<sup>3</sup> and an average size range of about 5-50  $\mu$ .

15. The method of claim 1 wherein the active nickel material is formed with cobalt  
hydroxide and cobalt oxyhydroxide.

16. The method of claim 1 wherein the active nickel material is oxidized more than  
30 1%.

17. The method of claim 1 wherein the active nickel material is oxidized 3% to  
70%.

35 18. The method of claim 1 wherein the active nickel material is provided with a  
surface that is less than 98% oxidized.

19. The method of claim 1 wherein the active nickel material is provided with a  
40 surface that is 5% to 75% non-oxidized and the remaining portion that is oxidized.